NON-PUBLIC?: N
ACCESSION #: 9104220136
LICENSEE EVENT REPORT (LER)

FACILITY NAME: South Texas, Unit 2 PAGE: 1 OF 3

DOCKET NUMBER: 05000499

TITLE: Reactor Trip Caused by Actuation of a Generator Protective Relay
EVENT DATE: 03/14/91 LER #: 91-003-00 REPORT DATE: 04/15/91

OTHER FACILITIES INVOLVED: South Texas Unit 1 DOCKET NO: 05000498

OPERATING MODE: 1 POWER LEVEL: 100

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR SECTION:
50.73(a)(2)(iv)

LICENSEE CONTACT FOR THIS LER:
NAME: Charles Ayala - TELEPHONE: (512) 972-8628
Supervising Licensing Engineer

COMPONENT FAILURE DESCRIPTION:
CAUSE: SYSTEM: COMPONENT: MANUFACTURER:
REPORTABLE NPRDS:

SUPPLEMENTAL REPORT EXPECTED: NO

ABSTRACT:

On March 14, 1991, Unit 2 was operating at 100% while Unit 1 was in Mode 5. At 1810 hours, Unit 1 Control Room personnel closed the switchyard breaker to energize the Unit 1 Main and Auxiliary Transformers. Immediately following this breaker closure, the Unit 2 B Phase Generator Isophase Bus differential relay actuated. This caused the generator lockout relay to actuate which resulted in a turbine trip and reactor trip. During the recovery process the Main Steam Isolation Valves (MSIV) were closed. A Steam Generator (SG) MSIV was subsequently reopened while a SG level was near the low-low setpoint and caused an Auxiliary Feedwater actuation. The protective relay actuation was caused by differences in the saturation rates of the two current transformers that supply the differential relay. The AFW actuation was caused by operating procedures that failed to provide guidance regarding minimum SG levels during MSIV manipulations. The corrective actions relative to the current transformers will be reported in LER 91-004, which describes a

similar subsequent reactor trip event. Procedures will be revised and this event will be included in requalification training to minimize the potential for unnecessary AFW actuations.

LER\91093001.U2

END OF ABSTRACT

DESCRIPTION OF EVENT:

On March 14, 1991, Unit 2 was operating at 100% power, and Unit 1 was in Mode 5 at 400 psi and 100 degrees during a refueling outage. At 18:16:40, the Unit 1 Control Room closed switchyard breaker Y510 to energize the Unit 1 Main Station and Auxiliary Transformers. At 18:16:42, the B phase Unit 2 Generator Isophase Bus differential relay (87-1/G1) actuated. This, in turn, actuated the Generator Lockout relay (86/G1) which caused a turbine trip and reactor trip. Feedwater isolation occurred on low Reactor Coolant System average temperature, and Auxiliary Feedwater (AFW) actuated on low-low steam generator level as expected. During the recovery process, auxiliary feedwater flow was manually isolated and main feedwater flow restored. To control the cooldown rate, the Main Steam Isolation Valves were manually closed. Subsequently, the steam pressure on the steam line header was equalized and MSIV 2A was opened at 1936. Immediately following the opening of MSIV 2A a second AFW actuation was received. All equipment functioned as expected.

The 87-1/G1 relay, which actuated during this event, received sensor inputs from a Current Transformer (CT) located in the neutral of the Main Generator and from a CT located on the Main Station Transformer (MST) side of the Generator Circuit Breaker (GCB). This relay, in turn, actuated the 86/G1 relay, tripping the Main Generator and Turbine.

Following the event, troubleshooting and fault recording analysis established that no actual fault occurred. Subsequent testing revealed that the current transformers associated with relay 87-1/G1 saturate at different rates, causing the relay to see a current differential across the generator when switchyard circuit breakers are closed.

At the time MSIV 2A was opened, SG 2A level was approximately 38%. Opening of the MSIV caused a swell and subsequent shrink in the SG to a point below the SG low-low setpoint (33%) and resulted in reactuation of AFW. It was determined that operating procedures did not provide guidance on the potential impact of opening an MSIV when SG water levels

are near the low-low setpoint.

CAUSE OF EVENT:

Actuation of relay 87-1/G1 and subsequent Main Generator Lockout was caused by a difference in the saturation rates of the CTs associated with relay 87-1/G1. Reactuation of the AFW system was caused by opening an MSIV while the SG water level was near the low-low setpoint. Procedures used during this evolution did not clearly indicate the potential for AFW reactuation to occur under these circumstances.

LER\91093001.U2

ANALYSIS OF EVENT:

Lockout of the Main Generator resulted in a Turbine trip and Reactor trip. During the restoration process following the trip, a second inadvertent actuation of the AFW system occurred. Automatic actuation of an Engineered Safety Feature or the Reactor Protection System is reportable pursuant to 10CFR50.73(a)(2)(iv). This event did not result in any increased risk to the safe operation of the plant. All safety systems functioned as designed.

CORRECTIVE ACTIONS:

The following corrective actions have been taken as a result of this event:

1) Evaluation of test data collected for relay 87-1/G1 and the associated current transformer continues. As indicated in the Additional Information section of this LER, a second Unit 2 Main Generator Lockout and subsequent reactor trip occurred on March 30, 1991. The LER associated with that event (LER 91-004) will describe the corrective actions to be taken relative to the current transformers.

2) Temporary modifications have been implemented in both Units to remove the trip capability of relay 87-1/G1. Redundant protection is provided by other protective relays.

3) Appropriate operating procedures will be revised by July 31, 1991 to provide guidance on the potential for an AFW actuation while performing manipulations that may lower SG levels below the SG low-low setpoint. As an interim measure, a tra

ning bulletin has
been issued to the plant operating staff emphasizing the potential
for AFW actuation during low SG water level conditions.

4) This event will be incorporated into the licensed operator requalification training program by August 23, 1991 to reemphasize the potential for an ESF actuation while opening the MSIVs near the SG low-low level setpoint.

ADDITIONAL INFORMATION:

On March 30, 1991, a second Main Generator Lockout trip occurred, initiated from the B phase 87-1/G1 differential circuit. This event will be described in LER 91-004 to be submitted by April 29, 1991.

LER\91093001.U2

ATTACHMENT 1 TO 9104220136 PAGE 1 OF 2

The Light
company
Houston Lighting & Power
South Texas Project Electric Generating Station
P. O. Box 289 Wadsworth, Texas 77483

April 15, 1991
ST-HL-AE-3748
File No.: G26
10CFR50.73

U. S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, DC 20555

South Texas Project Electric Generating Station
Unit 2
Docket No. STN 50-499
Licensee Event Report 91-003
Regarding a Reactor Trip Caused By
Actuation of a Generator Protective Relay

Pursuant to 10CFR50.73, Houston Lighting & Power Company (HL&P) submits the attached Licensee Event Report (LER 91-003) regarding a reactor trip caused by actuation of a generator protective relay. This event did not have any adverse impact on the health and safety of the public.

If you should have any questions on this.matter, please contact Mr. C. A. Ayala at (512) 972-8628.

William J. Jump
Manager,
Nuclear Licensing

SMH/sgs

Attachment: LER 91-003 (South Texas, Unit 2)

LER\91093001.U2

A Subsidiary of Houston Industries Incorporated

cc:

Regional Administrator, Region IV Rufus S. Scott
Nuclear Regulatory Commission Associate General Counsel
611 Ryan Plaza Drive, Suite 1000 Houston Lighting & Power Company
Arlington, TX 76011 P. O. Box 61867
Houston, TX 77208
George Dick, Project Manager
U.S. Nuclear Regulatory Commission INPO
Washington, DC 20555 Records Center
1100 Circle 75 Parkway
J. I. Tapia Atlanta, GA 30339-3064
Senior Resident Inspector
c/o U. S. Nuclear Regulatory Dr. Joseph M. Hendrie
Commission 50 Bellport Lane
P. O. Box 910 Bellport, NY 11713
Bay City, TX 77414
D. K. Lacker
J. R. Newman, Esquire Bureau of Radiation Control
Newman & Holtzinger, P.C. Texas Department of Health
1615 L Street, N.W. 1100 West 49th Street
Washington, DC 20036 Austin, TX 78756-3189

D. E. Ward/T. M. Puckett

Central Power and Light Company
P. O. Box 2121
Corpus Christi, TX 78403

J. C. Lanier/M. B. Lee
City of Austin
Electric Utility Department
P.O. Box 1088
Austin, TX 78767

R. J. Costello/M. T. Hardt
City Public Service Board
P. O. Box 1771
San Antonio, TX 78296

Revised 01/29/91

L4/NRC/

*** END OF DOCUMENT ***